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SOCIETY OF ARTS.

FRIDAY, FEBRUARY 25th, 1853.

ELEVENTH ORDINARY MEETING,

Wednesday, February 23rd, 1853.

The Eleventh Ordinary Meeting of the Society was held on Wednesday, the 23rd inst.; Major-General Sir Charles William Pasley, K.C.B., Vice-President, in the Chair.

The following were elected Members:

Buckmaster, J. C. Battersea.
Carthew, Peter, St. Mary Abbot's-terrace, Kensington.
Clemow, Frank, 162, Fleet-street.
Dykes, David Stewart, Deptford Pier.
Fasson, George, 3, Adelaide-place, London-bridge.
Jones, Jenkin, 1, Camden-square, Camden-town.
Rigg, Rev. Arthur, Chester.
Wilson, James, 128, Fitzwilliam-street, Sheffield.

and the names of eight candidates for membership were read.

A paper on Uniform Weights, Measures, and Moneys, by Professor Jack, of King's College, Fredericton, New Brunswick, was read. After a brief sketch of the history of the weights and measures used in different countries generally, but more especially in England, the Author pointed out the arbitrary and uncertain nature of the original standards. He stated that:

It was not till the beginning of the eighteenth century that philosophers became fully alive to the necessity of having the standards of weights and measures determined with the greatest accuracy and precision, in order that much of the knowledge, which time and observation had accumulated, might be available to posterity. In the year 1742, some Fellows of the Royal Society of London, on the one hand, and Members of the Royal Academy of Sciences at Paris, on the other, thinking it might be of good use for the better comparing the results of scientific experiments made in England and France, proposed that accurate standards of the weights and measures of both nations, having been constructed and carefully compared, should be deposited in the archives of each of the Societies. On investigation, the Committee of the Royal Society entrusted with the matter, found, besides the legal standard yard at the Exchequer, several others which were considered of almost equal authority. Of these, they selected the one kept in the Tower of London, as being the best defined, and therefore the best adapted to their purpose; and requested Graham, the celebrated clockmaker, to lay off from it the length of the yard on two brass rods. These were both sent to the Academy of Sciences; and the measure of the half toise having been laid down on each of them, one was kept at Paris, and the other —which was destined to play an important part, inasmuch as it served as the foundation from which our present standard measure was derived —was returned to the Royal Society, with whom it still remains.

In the year 1758, the House of Commons was induced to appoint a Committee to inquire into the original standards of weights and measures in the kingdom, and to examine the standards kept at the Exchequer, the Guildhall, and other places. This Committee presented to the House a very elaborate and valuable report; in which they recommended that a rod, which had been made at their order by Mr. Bird, from that of the Royal Society, should be declared the legal standard by which all measures of length were to be adjusted. A Committee formed in the following year concurred in the above recommendation, and at their suggestion Bird was employed to take a copy, or duplicate of what was intended to serve as the standard yard, in case of the latter being lost or injured. These were intrusted to the custody of the clerk of the House of Commons, and were called Bird's Parliamentary Standards of 1758 and 1760. Both reports were agreed to by the House, and a Bill framed in conformity with them was introduced, but for some reason or other it was never carried through; and although several attempts were subsequently made, no legislative enactment was passed, until 1824, "when, for the first time, a formal definition was given of our unit of measure; and that in the following terms. The straight line, or distance, between the centres of the two points in the gold studs in the brass rods, now in the custody of the clerk of the House of Commons, whereon the words and figures, *Standard Yard*, 1760, are engraved, shall be, and the same is hereby declared to be, the original and genuine standard of that measure of length or lineal extension called a yard; and that the straight line or distance, between the centres of the two points in the said gold studs in the said brass rod, the brass being at the temperature of 62° of Fahrenheit's thermometer, shall be, and is hereby denominated, the *Imperial Standard Yard*, and shall be, and is hereby declared to be the unit or only standard measure of extension." The adoption of Bird's rod as the standard has been severely and justly censured; for besides being a copy three degrees removed from the original in the Tower, which was itself never recognized as a legal standard, it seems to have been constructed with much less nicety than might have been expected. It, along with other standards, was destroyed by the fire which consumed the two Houses of Parliament, in 1834; and as yet, the steps by which, according to the Act of Parliament, they "*shall, and may be restored,*" in case of such a casualty have never been taken.

It will now be necessary to turn back a little to examine what were the proposed methods of restoration, and this leads to the second branch of the subject.

It is obvious that as the essential imperfection of language renders it impossible to convey by written law or oral tradition, any definite notion of the magnitude of a line without reference to some other line of known length, the chances of being able to replace a lost standard by another, which shall differ from it in length by a quantity so small as to satisfy the requirements of modern science, must depend either on the multiplication and careful preservation of exact copies of the original, or on the precision with which its relation to some determinate and invariable standard in nature, can be ascertained and afterwards recovered. At first view, the last method seems the best, as it is undoubtedly the most philosophical; and to it, accordingly, the Legislature of Great Britain gave the preference. But however desirable it may be, that our measure of length should be derived from something that cannot be altered by man, either from design or accident, it unfortunately happens that such a natural unit is not so readily found as might be imagined: in fact, none can be obtained without the aid of profound science, and a refined knowledge of the Arts. Laplace observes, "that the length of the pendulum, and that of the meridian, are the two principal measures which nature offers to fix the unity of linear magnitude. As both are independent of moral revolutions, neither can experience a sensible alteration, but by great changes in the physical condition of the earth."

The author then proceeded to describe the steps taken in France to obtain fixed and unchangeable standards of Weights and Measures, quoting at some length the important Report of the French Institute of 1798; and the similar attempts made by Great Britain, especially the well-known Commission appointed by Government, in 1818, for the purpose of forming new standards of Weights and Measures, or of determining the relations of those already in use to some unchangeable standard existing in nature. Both these attempts, he showed, had been altogether unsuccessful.

The trial made in France to procure a *fixed* standard directly from nature, and that made in England to determine the relation of one already in use to an invariable unit from the same source, having proved equally humiliating and futile, the Commissioners appointed in 1838, to consider the steps necessary to be taken for the restoration of the Standards of Weights and Measures, very properly recommended in their Report to the two Houses of Parliament, in 1841, the total disuse of all attempts to procure a natural standard, and the return to the old plan of standards manufactured in metal. They also advised that four copies of the best existing representations of the old standards should be made and carefully compared, and that one of these copies should be hermetically sealed, and imbedded in the masonry of some public building, marked by an inscription, and only to be opened by Act of Parliament; and that various precautions, minutely named, be taken for the preservation and safe custody of the others.

Before entering upon the third and last branch of the subject, it would not be unprofitable to consider what are the chief desiderata in a good system of weights and measures, and how far it would be possible to secure them for a system already in operation in a great country. On these points, however, the principle according to which the suggestions for the changes afterwards proposed are made, will simply be indicated.

In the first place, then, it is highly desirable that simple, rapid, and uniform methods of calculation be obtained; and that their results be capable of being exhibited with clearness and precision. For these purposes it is admitted, on all hands, that the decimal scale is preferable to every other, inasmuch as it would reduce all numerical computations to the operations comprehended in the four common rules of arithmetic. Under such a system of weights and measures, therefore, a child would be able to learn everything necessary for entering upon the ordinary concerns of the world in one month, as well, if not better than he could do in twelve, under the present complicated and puzzling system.

In the second place, the primary units of an existing metrical system, more especially those used in the ordinary transactions of trade and commerce, ought, on no account, to be altered: and even in the multiples and subdivisions of these units no changes ought to be attempted, but such as, when assisted by a general sense of their manifest advantages, the authority of the Government could enforce the adoption of.

Taking these principles as a guide, the ordinary Tables of Weights and Measures can now be examined in detail; and as money is directly or indirectly the basis of all kinds of traffic, and therefore an essential element in all calculations connected therewith, it will be well to begin with the Table relating to it.

In the Money Table, the division of the pound into 960 farthings, and the supremacy of the Government in all matters relating to the coinage, happily facilitate the adoption of the decimal scale; and it is stated in the Report of the Commissioners, made in 1841, that no circumstance would contribute so much to the introduction of such a scale in the weights and measures generally, as the establishment of a decimal coinage. For this purpose there would be needed the following new coins:

1. A silver coin of the value of two shillings, which might be called a *Decine or Victorine*,—the latter name having been proposed by the Commissioners.

2. A silver, copper, or mixed coin, of the value of 2 $\frac{2}{5}$ pence, which might be called a *centine*.

3. A copper coin of the value of $\frac{960}{1000}$ or $\frac{24}{25}$ of a farthing, which might be called a *milline*.

With respect to other subdivisions of the pound, the half sovereign, and the crown would be retained, as being in accordance with the binary system, which, to a certain extent, has always been found most convenient in the retail trade; for the same reason the shilling and sixpence might remain as the half and quarter of the *decine*,—though it would perhaps be better that the latter should be withdrawn on account of the name and replaced by a silver coin of the value of 2 *centines* (=4 $\frac{4}{5}$ pence):—the farthing and the penny being nearly equal in value to the *milline* and the half *centine*, might continue to circulate for them, until new copper coins of the value of 1, 2, and 4 *millines*, respectively, could be issued. A copper or mixed coin of the value of 5 *millines* would also be found useful, and would probably render the issuing of the 1 *milline* coin unnecessary.

It might, at first view, be supposed that in this province (New Brunswick), on account of the coins being of different nominal values, no advantage would be derived from the introduction of such a system in Great Britain; but this is not the case, for a relation having been once established between the Pound currency and the Pound sterling (at present their relative values are as 1 to 1.217 nearly), the same relation expressed by the very same figures would subsist between their decimal sub-multiples. Sterling money would therefore be more easily converted into currency, or *vice versâ*, than at present; and in all internal transactions the full advantages of the decimal scale, in so far as relates to the coinage, would be enjoyed by that Province. These advantages all the business-men in the North American Colonies, will be ready to appreciate from their familiarity with the decimal system of their Republican neighbours.

Were the proposed change effected, the Money Table would stand as follows:

Millines.	Centines.	Decines.	Pound.
10	1		
100	10	1	
1,000	100	10	1

On turning to the Tables of Weights, in addition to the lamentable irregularity according to which the division proceeds, whereby it is rendered so burdensome to the memory, a source of confusion, perplexity, and fraud is discovered in having the same names attached to weights of different magnitudes. Thus, the Troy pound is less than the Avoirdupois in the ratio of 144 to 175; but the Troy ounce is greater than the Avoirdupois in the ratio of 480 to 437½; the drachm in Apothecaries weight is 60 grains, while the drachm Avoirdupois is only 27$\frac{11}{32}$ grains. With a view, in some measure, to remedy these serious and glaring defects, the Report of 1841 recommends that the use of the Troy weight be declared illegal, except for transactions in gold, silver, and precious stones; and that the Avoirdupois pound be adopted as the standard weight of the kingdom. To procure, as far as was thought possible, the benefits of the decimal scale, it also recommended the suppression of the stone and hundred-weight, and the substitution for them of weights of 10 pounds and 100 pounds respectively. It will now be shown, that without overstraining the principles already laid down, it is quite possible to go a little further. The Troy weight is used chiefly at the Mint, and by jewellers, physicians, and apothecaries; and the most important unit in it, and the one most frequently referred to, is the grain. The Government having supreme control over its own officers, could easily direct all weights taken at the Mint to be expressed in grains; and jewellers, physicians, and apothecaries, forming an intelligent portion of the community, would have no difficulty in reducing the different weights employed by them to the same denomination. Indeed, they ought not to grumble at being even compelled to perform this small amount of mental labour for the sake of general convenience. Moreover, it would better become the boasted enlightenment of the day to have physicians' prescriptions made out simply in grains, than to see them covered with the mystical symbols—remnants of the dark ages—which now adorn them. In Troy weight, therefore, it seems that the grain, or some simple aliquot part of it, from which it could be readily deduced, is all that it is in any way necessary to encumber our Tables with.

By far the most important unit in Avoirdupois weight is the pound. Now, it is well known that reference is much more frequently made to its half and quarter than to the corresponding number of ounces—and further, that the subdivisions of the ounce are seldom, if ever, used in practice, and accordingly few people have more than a confused recollection of them. In Great Britain, the stone of 14 pounds is a legal weight, and is employed for many purposes; but it has not found its way into this province (New Brunswick.) It thus appears, that in the weight now under consideration, the pound must remain intact, but that the lower denominations are of very little consequence. If the same submultiple of the pound that the pound is of the stone be taken, and then divided decimally, a weight equal to half a grain will be arrived at; and thus it will be possible to preserve and connect together in one Table all that is most valuable in both Troy and Avoirdupois weight, and also at the same time introduce in a great degree the decimal scale. The following Table will show more clearly how those objects may be attained:

Grains.	Millozes.	Centozes.	Decozes.	Ozes.	Pounds.	Stones.	Decones.	Hectones.	Kilone.
5	10	1							
50	100	10	1						
500	1,000	100	10	1					
7,000	14,000	1,400	140	14	1				
98,000	196,000	19,600	1,960	196	14	1			
			19,600	1,960	140	10	1		
				19,600	1,400	100	10	1	
					14,000	1,000	100	10	1

The fourteenth part of the pound might receive a new name, but it would probably facilitate its adoption to call it the *Imperial ounce*, and to distinguish it in writing as shown in the Table. The present weights of 8 ounces and 4 ounces might continue for a time in circulation as the half and quarter pound, but it ought to be observed that their values in the new denomination would be only 7 ozes and 3½ ozes respectively. The remaining submultiples of the pound would require to be withdrawn, and replaced by such others of the new denominations as might be thought necessary. The 2 ozes weight would be particularly useful for scientific purposes, since it would contain exactly 1,000 grains.

It will be perceived that the above Table deviates from the decimal scale only in the middle, where 14 is a common multiple of the oze and of the pound. It therefore possesses a certain regularity, which would insure its being easily remembered. In the ordinary concerns of every-day life, the pound would serve as the superior unit, which would probably, after the advantages of the decimal division had been fully felt and developed, be in a great measure superseded by the oze. For the heavier transactions of business, the stone and its decimal multiples would be employed. In the suppression of the hundred-weight, nothing more is done than was recommended by the Commissioners of 1838; and the use of the ton in matters of shipping, where it is taken in the sense of a measure of capacity, and not as a weight, could not be urged as a reason against removing it from the Table of Weights. The facility with which, when required, the old weights could be reduced to the new, or *vice versâ*, will be apparent from the following considerations. *Millozes* are obtained by simply doubling the number of grains, and the higher divisions up to the oze, are just ten times the lower. The imperial ounce is heavier than the avoirdupois by just $\frac{1}{7}$, and than the troy by $\frac{1}{24}$; the *Decone* is $\frac{1}{4}$ heavier than the present cwt.; the *Hectone* is equivalent to $\frac{5}{8}$ of the ton; and the *Kilone* is $6\frac{1}{4}$ ($\frac{100}{16}$) tons, or 125 cwt.

The standard pound Troy, by which all other weights were to be regulated, was destroyed with the standard Yard, by the fire that consumed both Houses of Parliament in 1834. In scientific theory it was supposed to be deduced from the standard for lineal extension, and in this respect to originate with the grain, which was to be of such magnitude that 252·458 grains, in brass, would just be in equilibrium with a cubic inch of distilled water, when the mercury stands at 30 inches in a barometer, and in Fahrenheit's thermometer at 62 degrees, both for the air and for the water. The impossibility of reproducing it according to this principle, which was nevertheless prescribed in the Imperial Act of 1824, has already been pointed out.

The extreme inconvenience and absurdity of the "fluid measure" used by Apothecaries, was next pointed out; and the following modified Table suggested as a more practical and convenient system of admeasurement:

Minims.		Millims.		Centims.		Decims.		Pints.		Quarts.		Gallons.		Pecks.		Bushel.
10	=	1														
100	=	10	=	1												
1,000	=	100	=	10	=	1										
10,000	=	1,000	=	100	=	10	=	1								
20,000	=	2,000	=	200	=	20	=	2	=	1						
				800	=	80	=	8	=	4	=	1				
				1,600	=	160	=	16	=	8	=	2	=	1		
				6,400	=	640	=	64	=	32	=	8	=	4	=	1

In the Table of Long Measure, the yard and foot are units in such constant use, and have become so intimately associated with our ideas of lineal extension, and are besides of a length so convenient for the purposes to which they are severally applied, that any attempt to suppress either the one or the other would justly be regarded as little short of madness. The different multiples and submultiples of these are obtained in the most irregular manner; but all of them being more or less in common use, and to some extent connected with the records of knowledge, none of them could be withdrawn without occasioning considerable disturbance in national habits. The Commissioners, therefore, in their Report made in 1841, have not thought it advisable to urge any fundamental change in this part of the metrical system, but have contented themselves with strongly recommending the recognition of a new measure of 1,000 yards, to be called a *Milyard*, in all bills relating to railways, roads, and canals, and in the collection of duties upon them. On looking at the matter in a practical light, it may fairly be doubted whether the Commissioners have chosen the proper starting point. It is well known that surveyors and engineers employ neither the yard nor the inch, but work by the foot, and its decimal divisions. They have also brought into very general use ten-feet measuring staves, which are invariably graduated after the same manner. Moreover, in foot-rules and scales, the decimal now generally accompanies the duodecimal divisions; and in philosophical instruments, and in the records of scientific experiments, the former has now almost entirely superseded the latter. Hence, it appears that, taking the foot as the basis, considerable advances have been made towards the adoption of a decimal scale; but no steps have been taken in the same direction from the yard. These beginnings might probably be extended, as shown in the following Table; which, however, is proposed with no little diffidence:

Millot.		Centot.		Decot.		Foot.		Dekeet.		Hecteet.		Kileet.		Myreet.
10	=	1												
100	=	10	=	1										
1,000	=	100	=	10	=	1								
10,000	=	1,000	=	100	=	10	=	1						
						100	=	10	=	1				
						1,000	=	100	=	10	=	1		
						10,000	=	1,000	=	100	=	10	=	1

The *Myreet*, which wants about $\frac{1}{19}$ of being equal to two miles, would be a very convenient measure for the purposes specified by the Commissioners, and could not fail to recommend itself to engineers. In the foregoing Table it will be perceived that the yard finds no place; but the omission is of little consequence, as its relation to the foot could always be stated separately, and the business of daily life is not likely to allow it to be forgotten. It would, in fact, be retained as a measure apart from the regular system, and continued to be used, though perhaps, after a time, for fewer purposes than at present.

Whatever tends to simplify the measures of length, will also to the same extent simplify such measures of surface and solidity as flow immediately from them. But the Table for the measurement of land, and that for the determination of capacity, are not formed by merely squaring and cubing the measures of length. In the former, as is well-known, a peculiar unit, called the *Chain*, is used. This was invented by Gunter, and consists of one hundred *links*, each of which is of such a length as to secure the advantages of the decimal scale in finding the area in acres. It is remarkable that this is the only example furnished by the Tables of the employment of the decimal division; and the fact of its having been proposed by an individual of no high repute or influence, and continuing for upwards of a century to be exclusively used in the manner he suggested, strongly illustrates the great practical convenience that would result from the general introduction of such a scale. Land measure would be further simplified by stopping short of the final reduction into roods and perches. The hundreth part of the acre might be denominated a *centare*, and the thousandth a *millare*.

As has already been observed, the diversity subsisting between the measures of dry and liquid capacity was not remedied till 1826, when the Imperial Gallon was adopted as the standard unit for all. In New Brunswick, the distinction is still allowed to exist, and the evil is further aggravated by a partial use of the imperial measures. In the internal trade of the province, the old wine-gallon is used for liquids of all kinds—ale and beer not excepted; our retail dealers, no doubt, perceiving that it would be less profitable to sell these by the larger measure that lawfully belonged to them: but the duties at the Custom-house are levied according to the imperial gallon. Our legal standard of dry capacity is the Winchester bushel of 2,150 cubic inches; but there is reason to believe that the imperial bushel of 2,218 cubic inches has been unwittingly introduced into some localities, under the supposition that every measure called a bushel must necessarily be of the same size. The highly objectionable practice of selling by heaped measure, which was very properly abolished in Great Britain by the Act of 5 and 6 Will. IV., c. 63 (1834) is still tolerated. The uncertainty attending such a method of measurement is well exemplified by the fact, familiar to many persons, that a boat-load of coals of fifty chaldrons from St. John will run, when re-measured at Fredericton, fifty-three or fifty-four chaldrons.

Our measures of capacity, therefore, stand very much in need of reform. For the sake of obtaining uniformity, not only with the mother-country, but also throughout the province itself, the imperial measures should be declared the only standards of both liquid and dry capacity; and selling by heaped measure ought to be utterly suppressed. It would also conduce to greater accuracy, and afford less opportunity for fraud, if all dry goods that are now sold either by heaped or stricken measure, were ordered to be sold by weight. Coals ought, most undoubtedly, to be weighed; and this could be done (as is the case with hay, at the common weigh-scales) at a less expense than they are at present measured. It would, likewise, be fairer to both buyer and seller to have grain and roots of all kinds taken by weight, and the bargain made at so much per pound, or per hundred pounds.

Owing to the Table of the measures of capacity being framed in almost perfect accordance with the binary scale,—which, as has already been remarked, seems the best adapted to the purposes of the retail trade,—it would be impolitic, and, perhaps, useless, to try to effect a change in the mode of subdivision; more especially as the lower units are readily convertible into decimal parts of the higher.

The introduction of the Imperial Gallon into Great Britain created considerable embarrassment in many departments of trade and commerce, and was, at the time, productive of a good deal of confusion and discontent. It was recommended solely on the ground that it would contain exactly 10 pounds avoirdupois of distilled water, at the temperature of 62° Fahrenheit, the mercury in the barometer standing at 30 inches; and would thus afford an easy method of verifying the accuracy of the gallon and its multiples and submultiples by the simple and expeditious process of weighing. On this account merely, a new measure, differing materially from every one of those that had long been in use, was adopted by the two Houses of Parliament. The only real benefit it conferred was the obliteration of the distinction between the measures of dry and liquid capacity, by making them all proceed from the same basis; and this could have been accomplished equally well by enforcing the uniform use of one of the old gallons. The alteration, however, having once been effected, it would be inexpedient and unwise to attempt to undo it.

Angular magnitude, unlike those we have been hitherto considering, has a natural unit of measure. The size of an angle depends on the difference of direction of its two containing sides. But there is a limit to this difference of direction: for, if we suppose one side of an angle to be moveable, and the other fixed, and the former to set out from coincidence with the latter, and revolve round its extremity, so as to make a continually increasing angle, it will, after performing a complete revolution, arrive at the same position which it occupied at first. A whole revolution, then, is the limit to the change of direction, and is a determinate unit which cannot be misunderstood. This unit may be subdivided in any way which is thought most convenient. In nearly all ages and countries the first subdivision has been into 360 equal parts, called degrees. The French philosophers, however, at the end of the last century, wishing to carry out their plan of a decimal scale in all things, resolved that the number should be 400, in order that the quadrant might contain 100 instead of 90 parts. But the ancient nonagesimal degree—a magnitude which had long enjoyed all the advantages of universality—could not be abandoned without needlessly disturbing old associations, and rendering it necessary to recalculate a great portion of our astronomical and logarithmic tables and formulæ. The proposed alteration has not, therefore, been brought about even in France: but had it been confined to the centesimal division of the lower denominations, there is little doubt but that, after a time, it would have been generally adopted as the sexagesimal division of the degree, and its submultiples is acknowledged by all men of science to be the most inconvenient of all the vestiges of ancient astronomy.

For the measurement of Time we have also a natural and determinate unit, namely, that portion of infinite duration which is called a day; and any attempt to divide this otherwise than into twenty-four hours, would be useless and absurd. The centesimal division of the hour would, however, tend greatly to simplify all calculations relating to time; but, for reasons quite obvious to every one, such an alteration would be very difficult to accomplish.

In conclusion, it may be remarked, that the Tables suggested may appear, in consequence of the decimal scale having been strictly adhered to throughout, more cumbersome than they need be in reality; for, on this side of the Atlantic it is found from experience, that there is a natural tendency to the centesimal scale, which would have the effect of reducing the denominations to half the number proposed. It will also be seen, from a comparison of the different Tables, that such uniformity in the system of nomenclature has been observed, that whenever a denomination is mentioned, its relation to its primary unit, and the unit itself, is at once suggested. The proposal of the Commissioners of 1838, that Great Britain should provide one set of itinerant standards for transmission from colony to colony, and that the same should be returned periodically to England, for the purpose of re-verification, seems well worthy of consideration; as by these, the standard measures in every section of her colonial empire could from time to time be adjusted, and thus perfect uniformity with one another, and with the originals, have been secured.

Dr. BOOTH, F.R.S. said, the first objection to the system just explained was the use of a new nomenclature, which, however scientific, would not meet with general acceptance. They might alter institutions, customs, manners, and even the religion of a country, but not its language. It was a most hopeless task to attempt to make a people change the names of familiar things. Another objection to the proposed system was, that the decimal system was not carried out perfectly; it was introduced only in part. Now, taken by itself, the popular system was much better for persons in a low state of civilisation, who did not keep written accounts; for nothing could be simpler than to divide into halves, quarters, eighths, and sixteenths. Another better system than the decimal was the duodecimal; for it admitted of four divisors—2, 4, 6, and 3; while the decimal only admitted of two divisors, 2 and 5; but the duodecimal, though good in theory, it would be hopeless to attempt to carry out at present. With our system of notation the decimal system was, he thought, the best for simplicity and readiness in performing arithmetical operations; and his objection to the system just proposed was, that it only carried out the decimal system partially, and in some parts introduced another system. He then laid before the meeting a complete decimal system, agreeing, as far as possible, with the present standards, and with but little change in names. He then proceeded to amplify and explain the system, which is set forth in the following table:

MONEY:

1000 Cents = 100 Tenths = 10 FLORINS = 1 SOVEREIGN.

WEIGHT:

1000 Scruples = 100 Drachms = 10 Ounces = ONE POUND $= \frac{\text{Stone}}{10} = \frac{\text{Cwt.}}{100} = \frac{\text{Hf.-Ton}}{1000}$

One Scruple = 7 Grains.

CAPACITY:

100 Gills = 10 Pints = ONE GALLON $= \frac{\text{Cask}}{10} = \frac{\text{Pipe}}{100}$

5 Wine-bottles = One Gallon.

LINEAR MEASURE:

One Crown Inch, or Dece = 7·92 Inches.
One Crown Foot, or Link = 79·2 Inches.
One Fathom = 79·2 Inches = 6·6 Feet.
10 Fathoms = ONE CHAIN = 22 Yards.
100 Fathoms = 10 Chains = One Furlong.
1000 Fathoms = 100 Chains = 10 Furlongs = One Mile.
One Crown Yard = Half a Fathom = 39·6 Inches.

The crown yard differs from the length of the seconds' pendulum by less than half an inch.

SUPERFICIAL MEASURE:

One Square Fathom = 43·56 Square Feet.
10 Square Fathoms = One Pole.
100 Square Fathoms = Ten Poles = One Square Chain.
1000 Square Fathoms = 100 Poles = 10 SQUARE CHAINS = ONE ACRE.
1,000,000 Fathoms = 1000 Acres = One Square Mile.

The measures in capitals are those at present in use.

In enforcing and illustrating the advantages of this system in its varied details, Dr. Booth remarked, that in regard to land measure, the land chain must remain the standard, or otherwise most inextricable confusion would ensue. In articles sold by ounces or gallons, when the transaction was over there was an end of the matter; but in regard to land, it was a more stable and permanent affair; and all the land in the country having been divided and plotted by means of the chain, it would be impossible to alter it. Another remark he wished to make was, that a reform of this kind was not one that could be introduced bit by bit; to make any alteration without making all, would bring about most intolerable confusion. In making the change, therefore, they must have all or none.

Mr. W. BROWN, M.P., would read a letter, which he had addressed to the Board of Inland Revenue on the subject of decimalising the coinage. It was a subject of great importance, especially at the present juncture, when so many of the mercantile population were emigrating. The present system was full of inconvenience—it doubled the labour of clerks, and increased the chances of mistake: any labour-saving element was therefore of moment. He then read the following letter:—

Liverpool.

DEAR SIR,—I have cast my eye over Colonel Pasley's work of 1834, on the subject of Coins, Weights, and Measures, and also over Mr. Henry Taylor's "Simple Arithmetic," published in 1847, and the "Companion to the British Almanac of 1841," (Part 1.,) and it is impossible to read what they state without being struck with the advantages that would arise to all parties keeping books, and to the teaching in schools, from decimal arrangements instead of our present confused system. I should be glad of your able assistance in bringing the whole subject of Coinage, Weights, and Measures, under the consideration of the Chancellor of the Exchequer. I see from Mr. Taylor's work that a new Act of Parliament would not be necessary to regulate and decimalise our Coinage, which is the entering wedge to bringing the Weights and Measures into a harmonious decimal system throughout the kingdom. If the Government will bring forward an Act of Parliament to carry out these views with respect to Weights and Measures, to be put in force by an order in Council at some future period, all new school-books for teaching the use of figures would, as a matter of necessity, embrace the new arrangement, and the rising generation would be made familiar with it.

So far as the coinage goes, it appears to me to be a very simple matter. Let us glance at what the United States have done without any difficulty. The New England States and Virginia called the pound sterling 1*l.* 6*s.* 8*d.*; New York and North Carolina, 1*l.* 15*s.* 6⅔*d.*; the Middle States, 1*l.* 13*s.* 4*d.*; South Carolina and Georgia, 1*l.* 0*s.* 8$\frac{8}{9}$*d.*; and the Spanish dollar, taking the States in the same order, was called 6*s.*, 8*s.*, 7*s.* 6*d.*, and 4*s.* 8*d.*, and their accounts were kept in £. *s.* *d.* You know they are now simply dollars and cents, 100 cents making a dollar. Their present coinage is the gold eagle, 10 dollars; half-eagle, 5 dollars; the dollar, half-dollar, and quarter-dollar, and 10 or 5 cent pieces. The 12 and

6¼ cent pieces are, I believe, still in circulation; but they create no difficulty, and the fraction in the 6¼ cent piece is sunk.

The only alteration in our Coinage would be in the penny, and the most ignorant person would at once see that the shilling (if they still choose to call it so), under the new arrangement would be fifty farthings, and the present sixpence equal to twenty-five farthings. A farthing implies four parts; a pound did imply a pound in weight, and was originally so, but as it now stands, we perfectly understand it, and would equally well understand that a penny was five farthings.

The alteration proposed, then, is to make our present 96 farthings, contained in 2*s*., into 100. Thus, in a trifling degree decreasing the value of the present farthing, our Money Table would stand:

£1	=	....		1000	Farthings.
5 Alberts	=	half a sovereign......	=	500	,,
1 Albert	=	2*s*.	=	100	,,
½ ,,	=	1*s*.	=	50	,,
¼ ,,	=	6*d*.	=	25	,,
1 Penny	=	....	=	5	,,

I do not see any practical difficulty in calling the present penny five farthings, it being understood that Government, when they called it in, would give a copper coin of the value of five farthings for it. All new coins to be issued ought to have the number of farthings stamped on the back from the "Albert" down. By this arrangement, I cannot see that injury would arise to any one.

I think it of great importance to retain familiar names, where the coins are or approximate the same value so nearly as a new copper coin would that now in use. Tythings, cents, and dimes, would not convey to an English ear the value of the coin half so readily as the "Albert" or florin, and the farthing.

The 2*s*.-piece and the "Albert" would instantly convey the idea of their being the same value. The farthing would have so small a per centage difference, that in retail dealings it would scarcely be taken into account. It would not alter the ruling of our books,—pounds, Alberts, and farthings, would stand in the place of £. *s*. *d*. Thus, 1*l*. 19*s*. 11¾*d*. would be written 1*l*. 9a. 99f. (four figures instead of seven.) It is really not creditable to us, the most commercial people in the world, to have such an unnecessarily complicated system in our Accounts, Weights, and Measures.

I would make it imperative, that after a certain period, no suit could be maintained in a court of justice unless the accounts were kept in £. A. Fgs.

This decimalizing of our coinage would not affect your revenue at all, and greatly simplify the mode of keeping your accounts. If you can induce the Government seriously to contemplate and complete such a change, it would prove most beneficial to the nation.

Yours very truly,

WILLIAM BROWN.

John Wood, Esq., Inland Revenue Board.

Mr. BROWN had recently brought the subject before the Liverpool Chamber of Commerce; and as many of the members were deeply anxious for some plan of simplifying monetary transactions, they appointed a Sub-committee to examine and report upon the subject. Another gentleman and himself took the leading part in the Committee; and he would read from the Report, which was in favour of a Decimal System, this other gentleman's views. He proposed to retain "The present Sovereign as the Integer of account, substituting for the Shilling the new Florin, just issued, as a tenth part; and using the Farthing instead of Pence, making that coin, to be termed more correctly in future 'Cents,' current as 100 to the Florin, and 1,000 to the Pound. Thus, without altering the mode of stating accounts, and with but a slight change in value (and that in the Copper Coins and Fourpenny-pieces only), a complete Decimal System will be attained. Our accounts, therefore, will stand thus:—Pounds, Florins, and Cents, and the relative value of the coins will be

A Sovereign...............	equal to	1,000	Cents.	
Half-sovereign	,,	500	,,	
A Crown	,,	250	,,	
Half-crown	,,	125	,,	
A Florin	,,	100	,,	—or 1-10th of a Sovereign.
A Shilling..................	,,	50	,,	
Sixpence	,,	25	,,	
Fourpence	,,	16⅔	,,	
Threepence	,,	12½	,,	
A Penny	,,	5	,,	
A Farthing, or Cent ...	,,	1	,,	—or 1-100th of a Florin, and 1,1000th of a Pound.

The change of making the Sovereign equal to 1,000 Cents will necessarily alter the denomination of the present Copper Coins and Fourpenny-pieces to a slight extent, and our Pennies and Fourpenny-pieces might be called in, the former to be replaced by a new coin of the proportionate value now proposed. A great additional advantage in this plan would be, that the existing habits and customs of the people would not be disturbed further than is absolutely necessary to the adoption of a Decimal System."

The Report concluded by recommending that the subject should be brought under the notice of the President of the Board of Trade, the Chancellor of the Exchequer, the Chairman of the Board of Inland Revenue, and the Governor of the Bank of England. This, Mr. BROWN observed, had been done; and he had himself, a day or two ago, seen the Governor of the Bank of England, who told him that the Chancellor of the Exchequer had recently communicated with the Bank to ascertain the expediency of such a change, and they had replied that it would be very desirable. The Bank of England had already taken the initiative in the matter, for they would only buy and sell gold and silver decimally. The letter forwarded to these authorities by the Liverpool Chamber of Commerce recommended, substantially, the adoption of the system just mentioned. Mr. Brown then referred to the plan, recommended by many scientific men, of assimilating our coinage to that of other countries. The fatal objection to that was, that we could have no certainty they would not debase our coins. For instance, he saw the other day in an American paper a proposal to exchange for half or three-quarters per cent., and to change the value 7 per cent.: thus there would be a great danger of our coins returning with less gold and silver in them. The loss and expense in which this country might thus be involved would best be seen by referring to the exports of gold for the last six years. He concluded by saying that he had brought the matter before several Members of Parliament, begging them to call the attention of the Board of Trade to its advantages. That Board, he knew, was not unwilling to engage in the matter, if the country was ready for the measures. His advice was, therefore, that the House of Commons should be memorialised on the subject.

Mr. JAMES YATES, F.R.S., offered some remarks on the various systems and their relative advantages, but thought that so long as men had ten fingers they would reckon by tens and multiply and divide by decades. He thought, as a perfect system, nothing was preferable to the French, which, in something like twelve names, comprised the whole range of Weights, Measures, Coins, &c. In confirmation of that view, he referred to the opinion of John Quincy Adams. He explained the philosophy of the French basis in taking a certain portion of the meridian, reckoning from the pole to the equator. He then proceeded to speak on the advantages of a system of coinage which was of one value in different countries, as was the French money in different parts of Continental Europe.

Captain Owen, R.E., coincided with Mr. Yates, but thought the only objection to any present change was the probability that in the course of a few years a European Congress might sit to decide such questions.

The Chairman then proceeded to detail the history of his interest in, and acquaintance with, the subject, since the year 1831, during which period he had given every moment of spare time he could command to the study. It appeared to him that a standard of measure ought to be adopted which should be universal to mankind, and he considered the terrestrial meridian the proper standard; he meant the nautical, geographical mile; this was the standard recognised by every nation of the earth. He found that the thousandth part of this mile was very nearly an English fathom; and if we adopted this instead of our present foot and yard, and took the sixth part of a fathom as a standard foot, this would be the best standard for lineal measure. The change thus proposed was exceedingly trifling, being, in regard to our present standard, as 80 to 81. For superficial measure the foot alone should be the unit. In land measure he proposed that 100 links form 1 chain equal to 10 fathoms, and 100 chains 1 mile; 100 square links should be 1 square fathom; 1,000 square fathoms, 1 square acre; 1,000 square acres, 1 square mile. In measures of capacity, the cubic foot should be the only standard. In regard to weight, he proposed the pound as the standard, with tens, hundreds, and thousands, as its only multiples. Halves and quarters were admissible as agreeing well with a decimal system. In regard to money, he coincided with Professor Jack and Mr. Brown, choosing 1*l.* sterling as the unit, the hundredth part to be called a cent., and of that the tenth part might be called a farthing. Shillings and sixpences might be retained; a shilling being 5 cents, and sixpence 2½ cents. A system like this might become universal, and be adopted by the whole world; and if it were so, the benefits would be incalculable.

After a vote of thanks to Professor Jack for his communication, the Secretary announced that at the next meeting, on the 2nd of March, a paper would be read by W. Sterling Lacon, Esq., " On the Management of Ships' Boats, and the Loss of Life at Sea."

LECTURES ON COTTON.

The second and third Lecture of Mr. Warren's course on the Cotton Trade and Manufacture, were delivered on the evenings of Thursday, the 17th, and Monday, the 21st. Want of space prevents the insertion of the report of those lectures this week; it will be given, together with a brief abstract of the concluding lecture, next week.

INTERCHANGE OF PRIVILEGES.

The list of Institutions which have agreed to the general interchange of privileges, as stated in the last number of the Journal, will shortly be published; the Secretaries of those Institutions desiring to join in this arrangement, and which have not already communicated their intention to the Secretary of the Society, are requested to do so.

PHARMACEUTICAL EDUCATION.

The following letter, on the adaptation of Literary and Scientific Institutions to Pharmaceutical Education, from a correspondent at Modbury, appeared in the last number of the *Pharmaceutical Journal:*

" On reading your remarks headed, 'The Lectures at the School of Pharmacy,' Mr. Scholefield's communication, 'Pharmaceutical Education, Means to the End,' and the observations of 'Juvenis' in the December number of the *Pharmaceutical Journal*, the idea occurred, that probably the difficulties of each case, and also with regard to the publication of lectures, might, to a certain extent, be overcome, by organizing a systematic plan of *class teaching* throughout the country. It is a well known fact, that in almost every town there exists a 'Mutual Improvement Society,' 'Literary and Scientific,' or 'Mechanics' Institution,' —225 of which, numbering 90,000 members, have recently joined themselves in union with the Society of Arts, London.

" Would it not be desirable that in remote districts, where no Philosophical Society exists, for the express instruction of young men in the various branches more immediately connected with the routine of a Pharmaceutical education, advantage should be taken of the opportunity afforded by the above-named Societies, and every inducement held out in urging our youth to become members, and form *classes* for the study of Languages, Botany, Chemistry, and the various branches of Natural Philosophy, according to time and requirements. Very many of these Institutions are already supplied to a certain extent with chemical and philosophical apparatus; and it only requires combination and 'willing private instructors in the principles of the present day for the purpose in view.'

" This is not expecting too much of those who have the cause of education at heart: and I am of opinion with Mr. Scholefield 'there are few towns where some one would not be found gratuitously, or for a trifling remuneration, competent' to the above undertaking, 'which I think would be eagerly sought after and supported;' more especially as 'the Council of the Society of Arts are engaged in endeavours to procure from men of eminence, *MS. lectures* which may be circulated among the associated Institutions, to *organize a system of class teaching, and to provide a collection of diagrams, models, &c., for illustrations.*' Though these may not treat directly of Pharmacy or Materia Medica, yet they would embrace Chemistry and other branches of physical science, thus indirectly supplying an invaluable amount of information bearing upon the above subjects. With the many excellent treatises on Chemistry, Pharmacy, and Materia Medica, already in existence, and the aid offered through the associated institutions by the Society of Arts, it is to be hoped members of the Pharmaceutical Society, many of whom are highly competent to the task, will take the lead, selecting from among themselves those best qualified as tutors, and preside over classes of associates, apprentices, and others, for mutual instruction.

" The early closing of shops in most towns is an additional reason for devoting a portion of the time rescued from business to study, and where can it be more profitably turned to account than in the class room?

" 'All branches of science are so intimately connected, that a *compound institution* might be maintained by uniting several societies, and arranging the meetings so as to accommodate each in its turn.'

' The above suggestions are not intended to depreciate the value of lectures; on the contrary, those students most diligent in a class will be found best able to appreciate lectures of professors, whether delivered orally or read from a report."

HOME CORRESPONDENCE.

SCHOOL-SITES ACTS.

Dear Sir,—Having seen a great deal of the working of the School-Sites Acts, I am desirous to express my dissent from several of the opinions published in the last Journal under the signature of "F. P." It would be difficult to over-estimate the advantages which the promoters of Schools have derived from these Acts. Under them have been executed and enrolled at least 3,000 conveyances, not one of which, as far as I know, has been called in question. It is a mistake to suppose that the "machinery" by which these Acts are "to be worked" is "applicable to Schools, but not to Institutions." Some of the provisions, in reference to Parliamentary grants and other points, would be inapplicable to, and imperative upon, Institutions; but the leading principles and facilities afforded by the Acts might, with very great advantage, be rendered applicable to Institutes.

Whether it would be better to adopt the course suggested by the Committee—that is, to declare the School-sites applicable to Institutions—or the course suggested by F. P.—that is, to insert all the requisite provisions in full detail in the Institutions' Act, whether they be taken from the School-sites Acts or elsewhere—is, of course, an important question; and it seems to be not less important to bear in mind that the difficulty of carrying through Parliament a Bill framed on the latter plan would be very much greater than on the former. Perhaps the best course would be to get the Government to consolidate the School-Sites Acts into one Act, and then to provide by the Institutions' Act that the Consolidated School-Sites Acts shall be applicable to Institutions as well as to Schools. Yours faithfully,

Brighton, Feb. 23, 1853. H. C.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Institution of Civil Engineers, Feb. 22.—J. M. Rendel, Esq., President, in the chair. The evening was entirely devoted to the renewed discussion of Mr. B. Cheverton's Paper, "On the use of Heated Air as a motive power."

The construction of Ericsson's Engine, and the application of the regenerator were first described, and it was then argued, that the action of the regenerator almost amounted, theoretically, to the creation of force, and that it was not of the utility that had been presumed. From the best accounts, it appeared that various practical difficulties existed, in the application of heated air as a motive power, and from calculations which were entered into, it was shown, that the mean pressure of the air in the working cylinder being 4½lbs., the engines making eleven strokes per minute, a total power was developed, which, after making a proper deduction for friction and waste, did not exceed 280 horse power with the cumbrous machinery which was described; it was then contended that with such a fine model of a ship, and under the circumstances of the experiments, a greater speed than seven miles an hour ought to have been attained, with a less expenditure of fuel, and that, therefore, at present, the Caloric Engine could not be practically regarded as a successful innovation.

Tables and diagrams were exhibited, for the purpose of showing the relative amount of power obtainable from a given quantity of heat, applied in expanding air and in producing steam. From these it appeared that after taking into account all the conditions of each case, the useful effect would be nearly the same, independent of the regenerator, which, if not a fallacy, would turn the scale in favour of the use of heated air.

It was submitted by other speakers, that the machine involved a mechanical fallacy, as the regenerator produced no mechanical effect whatever. It might be granted, that the regenerator of Ericsson's engine received and re-delivered the heat, in the manner described, and that when the working piston was descending, the heat was deposited, and that when ascending the heat was restored; but that operation could only result as a *consequence* of the motion of the piston, and not as a *cause* of its motion—hence no mechanical effort was made. This result was easily shown, by assuming the contents of the pump to be 1, and the contents of the working cylinder to be 2. If the working piston was at the bottom of the cylinder, and in equilibrium with the external atmosphere, as regarded the pressure on a unit of surface, and then began to move and the air to be heated, in its passage through the regenerator from 32° to a temperature of 512°, so as to double its volume, the lower piston would constantly produce a vacuity, so to speak, of 2, to be constantly fed by a supply of 1, from the pump, expanded into 2, by the increase of temperature. Consequently the piston, at every instant of its motion, remained in equilibrium with the external atmosphere, and no mechanical effect could result. Still in Ericsson's engine a mechanical effect had been produced; but then this mechanical effect was no greater than would be produced without the aid of the regenerator, by the simple action of the furnace itself, and not so economically as by the use of steam.

Further investigations were entered into of the theory of the Air Engine, and the general result appeared to exhibit so much distrust of the accounts already received, of the working of the caloric ship, that it was suggested, that the further discussion of the subject should be adjourned for a few weeks, and meanwhile another paper was proposed to be written, so that the question could be more fully discussed on the next occasion.

PROCEEDINGS OF INSTITUTIONS.

Boston.—The Annual Meeting of the Members of the Athenæum took place, in the Guildhall, on Friday, the 18th inst.; W. H. Adams, Esq., J.P. (one of the Vice-Presidents), presided. The Secretary, Mr. J. W. Bontoft, read the report; from which it appears that the Institution is still progressing. There are 420 members. The financial position is satisfactory,—a small balance being in the hands of the Treasurer. The supply of the reading-room, rent, &c., is estimated to have cost, for one year, 83*l*. 9*s*. 4*d*.; and the library, 62*l*. 15*s*. 3*d*. The gross receipts for the year amount to 184*l*. The books in the library number 1,860, and have circulated 4,813 times. The circulation of periodical literature (principally newspapers) amounts to 4,350 entries. Several gratuitous lectures have been delivered during the season. There are two classes, French and reading, in operation. In regard to the Union with the

Society of Arts, the report stated that, "Your Committee are happy to say that their expectations have not been disappointed; for though only a short time has elapsed since the formation of the Union, they have experienced, in several ways, the advantages of such a connection. * * * With further time and experience, there is every prospect of the scheme being extensively developed, and of its becoming of great value to the united Institutions; extending and developing their resources, so as to bring them up to the requirements of the times, and in yielding valuable assistance in the important work still to be done in increasing the knowledge, improving the manners, and, consequently, augmenting the usefulness and happiness of our growing population." In reference to a new and suitable building for the Athenæum, the report says: "Ere the members can expect to participate in all these benefits, better accommodation must be provided,—a suitable and commodious building must be obtained, in which all the objects of the Athenæum can be carried fully into practice. In many towns beautiful and commodious edifices have been erected, devoted to Science, Arts, and Literature,—an ornament to the place, an honour to the subscribers, and a blessing to the people. To obtain a similar blessing for the town and neighbourhood of Boston, ought now to become the paramount object of every member of the Institution." A vote of thanks to the Chairman, and one to the Secretary, concluded the business of the meeting.

Burnley.—A Lecture on "The Historic Evidence of the Genuineness and Antiquity of the Mosaic Narrative," was delivered to the Members of the Mechanics' Institution, on Thursday evening, the 17th inst., by the Rev. Alexander Strachan, Wesleyan Minister. The Lecture displayed considerable learning and research, and was well received by a numerous audience. Additional interest was afforded by the exhibition of a number of well-executed diagrams, illustrative of the hieroglyphic or symbolic writing. It is intended that the Lecture should be published; and Mr. Strachan will probably deliver a second Lecture, in continuation of the subject, contrasting the Mosaic narrative with the accounts of heathen nations.

Carlisle.—On Tuesday last, Mr. Joseph Bendle delivered an entertaining Lecture, "On the Atmosphere," to the Members of the Mechanics' Institution. The Lecturer stated that one of the main objects he had in view in addressing them was, if possible, to create a greater taste for scientific literature. The different properties which the atmosphere possesses, in common with all matter, was investigated and illustrated by a series of beautiful experiments. The construction of the air-pump was fully explained, as well as that of the ordinary pump and force-pumps, diagrams of which were displayed. He referred to Ericsson's recent invention of the caloric-engine, and spoke of the probability of hot air, in the course of time, entirely superseding steam as a motive-power. The constituents of the atmosphere, and the process of respiration, were also briefly alluded to.

Cupar Angus.—On the evening of Wednesday, the 16th instant, the members of the Mutual Improvement Society, along with a few friends, assembled in their meeting-room, to celebrate their Eighteenth Anniversary. The Chairman, Mr. James Simpson, in a very succinct and appropriate address, referred to the "Nature and Design" of the Society, and was followed by Mr. John Mill, on "Mental Activity and Moral Worth, essential pre-requisites of Physical Elevation and Political Advancement;" by Mr. Peter Fergurson, on "Brotherly Kindness;" by Mr. Robert Robertson, on "Youth, the season for Improvement." The proceedings were greatly diversified by the "Exhibition of Dissolving Views," and by Music, both of a sacred and secular character.

Poole.—Dr. T. Bell Salter, of Ryde, delivered, on Tuesday evening, to the members of the Literary Institution, a Lecture on "The application of the Fibres of common Plants to the purposes of Manufacture." The lecturer stated that he had been led to investigate it from the Exhibition of 1851, to which Mrs. Bevers, a lady in Ireland, had sent many articles manufactured by the peasantry from the fibres of several common plants. He indicated the various orders and families of plants from which fibre could be procured, and then explained experiments which had been made by the lady in question, by himself, and others, on the matter, exhibiting specimens of plants, with fibre, thread, and articles of dress manufactured from them; the principal of these, and the one from which most benefit might be derived, was the common nettle; amongst others named as fibre-producing plants, may be mentioned, nasturtium, mallow, lavatera, geranium, broom, sweet-pea, chrysanthemum, hop, some plants of the jessamine tribe, &c.; and he had no doubt from the common asparagus if the plants were cut rather earlier than customary. The lecturer concluded by practically applying the subject, stating that Mrs. Bevers commenced her researches for the charitable purpose of finding profitable employment for the poor in her locality, and he urged the advantage that would be derived by ladies in England emulating her; instead of buying materials for the work they prepared for bazaars, &c., to extract the fibre from plants growing in their gardens and hedges, and have the same prepared for their work. Attempts of this kind might in time lead to the production of a valuable article which might be applied to many purposes for which cotton is now used, and national prosperity be increased by the production amongst us of another raw material.

Southampton.—Mr. George Buckland delivered a Lecture to the members of the Polytechnic Institution, on Wednesday evening, on "Musical Characteristics," which consisted of brief running comments on the universal influence of music and its innumerable associations, illustrated by a variety of descriptive and other songs, Mr. Buckland accompanying himself on the pianoforte.

St. Leonard's-on-Sea.—The *conversazione* and Exhibition, in connection with the St. Leonards' Mechanics' Institution, which for the last three weeks has been open in the Assembly-rooms, was formally closed on Tuesday last, the 15th inst.; Alfred Burton, Esq., President, in the chair. It appears that, after defraying all expenses, the Exhibition will yield a balance of about 80*l.*, to be appropriated to the fund for building a new Institution; in addition to which a sum of 33*l.* has been subscribed. The number of visitors to the Exhibition, exclusive of the holders of tickets, had been 3,450; the number of Exhibitors upwards of 150, and the articles exhibited upwards of 1,200. The children of the St. Leonard's National Schools, and of the Hastings Union School, were admitted free. Papers on the following subjects had been read, viz.—"On Structural Changes in Iron," by Mr. J. Rock, jun.; "On the Study of Natural History," by Mr. W. R. Selway; "On some of the Curiosities in Natural History," by the same gentleman; "On Ancient History, suggestive of the means of extending Education among the Masses," by Horace Martin, Esq., President of the Battle Mechanics' Institution; "Why do Trees have

Leaves?" by Mr. Pitter; "On the Growth and Manufacture of Cotton," by Mr. Henry Lee; "On the Social Influence of Railways," by the Rev. J. Stent; "On some Improvements in Railway Carriages," by Mr. J. Rock, jun.; "On the Rebuilding of the Harbour at Hastings, and the State of the Shipping in the time of Elizabeth," by William Durrant Cooper, Esq., F.S.A. During the continuance of the *conversazione*, several papers on Galvanism and Electricity, illustrated with experiments were read; and one on Astronomy, by Mr. John Banks; and, lastly, one "On the Exhibition," by Mr. T. B. Brett.

TO CORRESPONDENTS.

Notice.—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Country Institutions.—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

A neat Case, for holding the Numbers of the Journal for half a year, is now ready, and may be had of the Publisher, 186, FLEET-STREET, price 1s. 8d.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

QUESTION FROM CORRESPONDENT.

Varnish for Iron.—Can you inform me what is the best mode of protecting iron from the action of the atmosphere? I have been told that a thin coating of shell lac is even better than boiled linseed oil. Can you tell me if this is really the case; and if so, in what manner it should be applied.—[No. 43.]

ANSWERS TO CORRESPONDENTS.

Photographic Apparatus, *No.* 23.—A description of Beauford's Accelerator will be found in the *Artizan Journal* for June, 1851.—M.S.

Copal Varnish.—In answer to your correspondent, No. 42, I have found the following method most efficient for the preparation of copal varnish:—The ingredients that are generally used are copal, turpentine, and linseed, or nut oil. Various qualities of copal varnish are made for different purposes; inferior gums are often substituted for or mixed with copal. Fuse 7 lbs. of copal, and pour on it, by degrees, 4 pints of clarified linseed or nut oil (using nut oil in preference), heated nearly to boiling. When this combination is made remove it from the fire. When the heat is abated to 150 degrees, mix in, by degrees, three gallons of oil of turpentine of the same temperature. When cooled to 130 degrees, it may be strained.—T. Y.

MISCELLANEA.

NEW CRYSTAL PALACE, SYDENHAM.—A close hoarding has been lately put up completely enclosing the statue of Charles the First, at Charing-cross. Within Mr. Brucciani is engaged in moulding the statue and pedestal for the Crystal Palace Company. Considering the prominent position of this work of art, it is astonishing how few are to be found who have looked upon it with attention, or who are aware of its great merit. This is particularly the case as regards the pedestal, which is the work of the celebrated Grinling Gibbons, and is a remarkably fine design. The carving is now somewhat dilapidated; but this, it is presumed, the Company will have completely restored when erected as part of their building, where its beauties may attract the attention they deserve. If this move be one in the right direction, are there not other statues of a similar character of equal merit, now buried, as far as public observation goes, in the squares of the metropolis, which might with equal propriety be treated in like manner?

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 16th Feb.*, 1853.
112. Hops (Acres of Land under cultivation)—Return.
114. Hops (Excise Duties)—Return.
117. Trade and Navigation—Annual Accounts.
123. Bill (amended)—General Board of Health; Queen's College, Cork—Report of the President; Clergy Reserves in Canada—Further Papers.

Delivered on 17th Feb.

101. Public Income and Expenditure (Balance-sheets)—Accounts.
99. Metropolitan Burials Act—Return.
124. Bills—Union of Benefices.
128. „ —Grand Jury Cess (Ireland); Case of the Madiais—Correspondence; Spain (Royal Spanish Decree)—Correspondence.

Delivered on 18th Feb.

105. Port of Dublin—Account.
107. Stipendiary Magistrates (Ireland)—Return.
109. Irish and Scotch Fisheries—Return.
126. Bills—Office of Examiner (Court of Chancery).
127. „ —Sale and Purchase of Land; Colonial Possessions—Further Reports, Part II.

Delivered on 19th and 21st Feb.

137. Army Estimate.
115. Naval Receipts and Expenditure—Account.
118. Specie and Bullion (Bank of England)—Return.
120. Mail Steamers (Cape of Good Hope and India)—Correspondence.
130. Cape of Good Hope—Copies of Petitions, &c.
138. Kitchen and Refreshment-rooms (House of Commons)—First Report from Committee.
132. Bills—Elections.
133. „ —Cruelty to Animals.
134. Clergy Reserves (Canada); Inclosure Commission—Eighth Annual Report; Tithe Commission—Report; Copyholds—Eleventh Report of Commissioners; Census of Ireland for 1851 (Agricultural Produce), Part II.

Delivered on 22nd Feb.

102. Trade and Navigation—Accounts.
136. Drunkenness, &c.—Return.
143. Bill—Oaths in Chancery, &c.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 18*th Feb.*, 1853.

Dated 17th Jan., 1853.

116. A. Inglesia—Measuring and gauging silk, cotton, &c., on reels.

Dated 21th Jan.

154. W. E. Newton—"Hawes' calendar clock or timepiece." (A communication).

Dated 26th Jan.

196. A. G. Cazalat—A new barometer and steam gauge.

Dated 1st Feb.

276. A. V. Newton—Block printing machinery. (A communication.)

Dated 2nd Feb.

279. A. E. L. Bellford—"Metallic oil," for lubricating, &c. (A communication.)
281. A. E. L. Bellford—Improvements in lifeboats. (A communication.)
283. A. E. L. Bellford—Furnaces for making wrought iron. (A communication.)
285. J. V. Kiddle—Improvements in cocks or taps.
287. J. J. Abadie and H. Lauret—Parasols.
289. T. Paine—Heels for boots and shoes.

Dated 3rd Feb.

291. M. Bower—Apparatus to prevent throwing up of mud by wheels.
293. W. S. Wright—Improved bath.
295. J. Bower—Pile-driving.
297. J. H. Johnson—Gas-burners
299. A. Tylor—Improvements in water-closets.
301. J. Crowther—Improvements in baking bread.

Dated 4th Feb.

302. W. Brown—Metallic bedsteads.
303. D. L. Price—Signalizing by electricity on railway trains, &c.
304. F. J. Jones—Fastenings for bands, belts, &c. (A communication.)
305. P. Webley—Repeating pistols and other firearms.

306. G. Winiwater—Application of explosive compounds.
307. J. Perkins—Treatment of bituminous substances.
308. R. Griffiths—Bolts and rivets.
309. J. Dudgeon—Machinery for raising propellers.
310. J. V. Asbury—Railway carriages.
311. W. Edgar—Improved boot.
312. G. Letts—Mincing meat and filling skins.
313. W. Walker—Apparatus for drying.
314. A. Woodward—Lever churn.
315. A. Woodward—Self-acting cam press.

Dated 5th Feb.

316. R. Prosser—Printing-rollers for calicos, &c.
317. T. Peacock—Weaving hat-plush, &c.
318. G. Hewitson—Measuring yarn as it is wound on rollers.
319. A. Wollowicz—Primers for firearms.
320. J. and J. Whitehouse—Knobs for doors, applicable to other articles of earthenware.
321. C. F. Werckshagen—Carbonate of soda and potash.
323. W. Crossby—Consumption of smoke.
324. J. Campbell—Treatment of textile fabrics.
325. H. J. Nichol—Garments for travelling.
327. E. Palmer—Railway-carriages.
329. J. Cowan—Propelling.

Dated 7th Feb.

330. W. Romaine—Rendering wood durable and uninflammable.
331. W. Scott, R. Brough, J. Rinoe, and T. Mann—Steam-engines.
332. J. L. Tabberner—Smelting iron ores, &c., and manufacture of lime.
333. J. L. Tabberner—Application of granite, &c., to ornamenting and construction of buildings.
334. A. J. Brooman—Sail-hanks, for securing staysails, jibs, &c. (A communication.)

Dated 8th Feb.

335. A. E. L. Bellford—Treatment of bituminous substances. (A communication.)
336. T. Howarth—Cement for steam joints, &c.
337. J. Buchanan—Propeller, and machinery for same.
338. T. Allan—Protecting telegraph wires.
339. T. Allan—Galvanic batteries.

Dated 9th Feb.

340. T. H. and S. Reynolds—Retarding progress of carriages.
341. H. Pooley—Weighing-machines. (Partly a communication.)
342. W. E. Newton—Digging and excavating-machinery.
343. W. Binks, S. Bennett, and T. Storey—Pumps.
344. J. Little—Lubricating.
345. W. Birkett—Treating soapsuds.
346. J. Seaward—Marine engines.
347. I. J. Machin—Nutcrackers.
348. C. Iles—Pointing wire.
349. J. Webster—Treating animal matters and manufacture of manure.

Dated 10th Feb.

350. J. S. Wilson—Consumption of smoke and gases, and utilizing the same.
352. C. Cuylits—Regulating speed of steam and other engines.
354. J. Hunter—Textile fabrics.
356. J. Anderson—Steam-engines.
358. H. M'Farlane—Machinery for excavating. (A communication.)

APPLICATION WITH COMPLETE SPECIFICATION FILED.

389. Looms for weaving. (A communication.) Feb. 15, 1853.

WEEKLY LIST OF PATENTS SEALED.

Sealed 10th Feb., 1853.

10. Freeman Roe, of the Strand—Improvements in valves and cocks.
109. William Austin, of Birmingham, and William Sutherland, of the same place—Improvements in ornamenting glass.
296. Alfred Trueman, of Swansea—Improvements in obtaining copper and other metals from ores, or matters containing them.
317. William Scholfield and Joseph Pritchard, of Oldham—Improvements in steam-boilers.
877. Thomas Ainsley Cook, of Wall's End, Northumberland—Improvements in bleaching.
898. William Edward Schottlander, of Southwark—Improvements in machinery for boring the ground, stone, or rocks, for the formation of drains and sewers, for the laying of pipes underground, and for removing obstructions therein; also in the manufacture of pipes to be used in connection with such machinery, and in instruments for surveying and levelling preparatory to the boring operations. (A communication.)
918. Joseph Skertchley, jun., of Kingsland, and of Ansty, near Leicester—Improvements in mangles and mangle-rollers.
959. James Murdoch, of Staple-inn—Improved galvanic battery. (A communication.)
1001. Anthony Norris Groves, of Madras, and Conrad William Finzel, jun., of Bristol—Improvements in condensing steam or vapours.
1058. Rudolph Appel, of 43, Gerrard-street, Soho—Improvements in anastatic printing, and in producing copies of drawings, writings, and printed impressions.
1068. Anthony Norris Groves, of Bristol—Improvements in apparatus for heating, drying, and evaporating.
1094. Alfred Krupp, of Essen, Prussia—Improvements in cannons.
1096. James Langridge, of Bristol—Improvements in the manufacture of stays.
1123. Warren De la Rue, of Bunhill-row—Improvements in preparing the surfaces of paper and card-boards.
1128. Ephraim Moseley, of Grosvenor-street—Improvements in the manufacture of artificial masticating apparatus.
1149. Jean Louis David, of Paris—Certain improvements in the manufacture of woollen fabrics.
1168. George Ingham, of Rochdale—Certain improvements in machinery for drawing cotton and other fibrous materials.
1171. George Gwynne, of Hyde-park-square, and George Fergusson Wilson, of Belmont, Vauxhall—Improvements in treating fatty and oily matters.
1183. Claude Joseph Edmée Junot, of No. 15, Rue Basse Passy, France—Improvements in the mode of reducing several metallic substances hitherto unused, and applying them so prepared to the plating of other metals and substances by means of electricity. (A communication.)
1184. Samuel Clegg, of No. 24, Regent's-square—Improvements in apparatus for measuring gas.
1203. Robert Steven Oliver, of Edinburgh—Certain improvements in waterproof and other garments.
14. Charles Edwards Amos, of the Grove, Southwark—Certain improvements in the construction of centrifugal pumps.

Sealed 22nd Feb., 1853.

203. Robert Hazard, of 14, Lincoln's-inn-fields—A calorific bath.
576. Bowman Fleming M'Callum, of Govan Croft Dyework, Glasgow—A yarn drying machine.
851. William Wilkinson, of Nottingham—Improvements in the manufacture of looped and textile fabrics, and in machinery for producing the same.
1093. William Wilkinson, of Nottingham—Improvements in the manufacture of looped-pile and cut-pile fabrics, and the machinery employed therein.

Sealed 23rd Feb.

199. Edwin Bates, of 7, Great Portland-street—Improvements for deriving motive power from expansive fluids, and for the better application and economy thereof for propelling ships and other vessels in sea, river, and canal navigation; also, in the shape and action of wind-sails, the use of water as a motive power for driving machines, mills, &c., the construction of Turbine's air and water-pumps, marine-pumps for emptying ships of bilge-water, and other useful purposes.
253. Charles de Bergue, of Dowgate-hill—Improvements in machinery for punching metals, and for riveting together metallic plates or bars.
258. David Chalmers, of Manchester—Improvements in looms for weaving wire, web, or cloth by power.
330. Henry Moorhouse, of Denton, Lancaster—Improvements in machinery or apparatus for cleaning woollen, cotton, or linen rags and waste, which machinery or apparatus is applicable to cleaning and tempering clay, or other similar purposes.
560. Arthur Ashpitel and John Whichcord, the younger, of Carlton-chambers, Regent-street—Improvements in cocks, valves, and fire-plugs.
625. John Cameron, of Manchester—Improvements in boilers for generating steam, and in feed-pumps and apparatus connected therewith.
1188. John Whichcord, the younger, and Samuel Egan Rosser, of Great Russell-street, Bloomsbury—Improvements in the mode of burning and applying gas for light and heat.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
Feb. 18	3423	A Spring-hat, Bonnet, or Cap-suspender.	James Barlow	14, King William-st., City.
,, 19	3424	Pencil-case.	Joseph Baker	Birmingham.
,, ,,	3425	The Multiple Gas-stove.	George Mair	41, Up. Bedfd.-pl., Russell-sq.
,, 22	2426	A Russian Bath.	Mathias Roth, M.D.	Old Cavendish-street.